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FACTS AND FIGURES

IN FAVOUR OF

THE PROPOSED

MANCHESTER SHIP CANAL:

SHOWING HOW TO SOLVE THE CHEAP TRANSPORT PROBLEM FOR THE GREAT IMPORT AND EXPORT TRADE OF LANCASHIRE AND THE WEST RIDING.

BIBLIOTHECA · BODLEIANA

By MANCUNIENSIS.

WITH MAP SHOWING DISTRIBUTION OF POPULATION
AROUND MANCHESTER.

Any improvement which will enable ocean-going vessels to discharge their cargoes in a commodious wet dock in Manchester would form an epoch of such magnitude in the history of Manchester as would quadruple her population, and render her the first as well as the most enterprising city in Europe.—*The late Sir Wm. Fairbairn on the Improvement of the Irwell.*

REVISED EDITION. PRICE ONE PENNY.

JOHN HEYWOOD,
DEANSGATE AND RIDGEFIELD, MANCHESTER
AND 11, PATERNOSTER BUILDINGS,
LONDON
1882.

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Gough Adds Lancash.
8° 153.

TO

DANIEL ADAMSON, Esq.

(BY PERMISSION).

SIR,

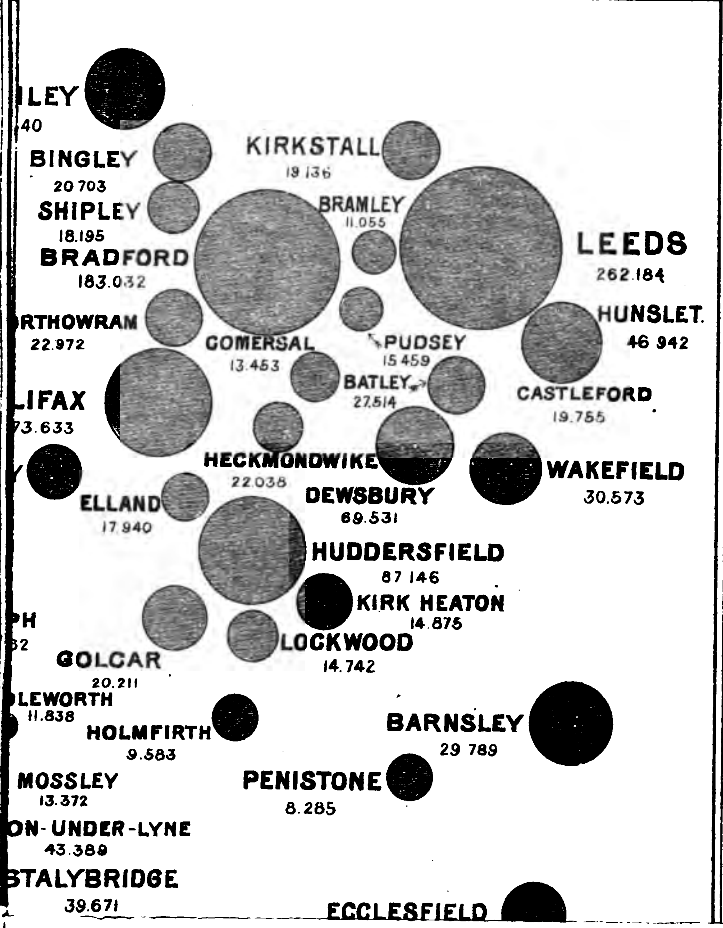
As the organic movement having for its object the constitution of Manchester as a Port for ocean-going vessels of the greatest capacity is so largely the result of your public spirit in making the question your own, I value the honour of being permitted to inscribe to you this revised edition of a little pamphlet which has met with so much encouragement at your hands.

Your obedient servant,

JAMES W. HARVEY.

Old Trafford, Manchester,
17th October, 1882.

AROUND MANCHESTER.



PREFATORY NOTICE TO REVISED EDITION

UP to the time when the first edition of this pamphlet was submitted to the public, in May last, no practical steps whatever had been taken to place, in a systematic form, before the people of Lancashire the enormous advantages which would result to the several great manufacturing industries of these districts and of the West Riding of Yorkshire by the construction of a Ship Canal to Manchester. The wide publicity given to the pamphlet by the press of Lancashire, and particularly by that of Manchester, has helped not a little to evoke the present popular sympathy with the movement. It is very doubtful, however, whether the subject would have passed beyond the mere discussion stage had it not been for the courage and public spirit shown by Mr. Daniel Adamson, of The Towers, Didsbury, who, towards the end of June of this year, invited a number of the leading trade representatives of the district to meet several of the mayors of the principal towns of Lancashire, in order to form a Committee of Investigation, whose mission would be to ascertain once for all, and at what cost, a Ship Canal to Manchester could be constructed. The outcome of the movement thus initiated is a recommendation by the Provisional Committee of the Report of Mr. E. Leader Williams, C.E, of this city, endorsed by Mr. James Abernethy, F.R.S., Past-President of the Institute of Civil Engineers. The plans thus recommended are, briefly, to deepen the Mersey between Latchford and Liverpool to twenty-four feet at low water, with a bottom width of one hundred feet. From Latchford, where a lock will be placed, to Irlam—seven miles from Manchester—to make a semi-tidal ship canal of equal bottom width, but with a minimum depth of twenty-six feet. A second lock at Irlam and a third at Barton will bring the vessels to within eight feet of the present level of the water at Throstle Nest.

Whether this be the best plan that could be devised for bringing deep-sea vessels up to Manchester it is not the province of this pamphlet to discuss, as it was not intended that purely engineering questions should be dealt with in its pages. Suffice it to say that the purely tidal scheme with a tidal basin at this end has been condemned by high engineering authorities as impracticable for several important reasons.

It will no doubt be a disappointment to many not to have the influence of the tide felt at Manchester, but if locks be indispensable it will make no difference in time to the vessels passing through them whether these be at the docks at Liverpool or at Mode Wheel Mill. And it must be remembered that by having a lock at a considerable distance down the river a very large amount of excavation will be saved.

Now that there is an authoritative statement as to the outlay necessary to enable large deep-sea vessels to bring their cargoes to Manchester, something approaching to a rough estimate can be made of the prospects of the ship canal as a paying concern. The estimates of the engineers fix the cost of the canal, including the great dock basin at this end, at £5,400,000. Therefore to pay five per cent on say £6,000,000, the canal must possess a net revenue, after paying all the current expenses, of £300,000 per annum. What amount of tonnage must use the canal in order to yield so considerable a net revenue?

A statement has been made that a toll of 3s. per ton is to be levied on the goods using the canal. It is presumed that this figure represents the average toll; as coal, iron, and other weighty articles could not bear so high a charge. If we suppose say 2s. 6d. per ton as an average, it would be necessary that not less than 2,400,000 tons of goods should pass over the navigation each year. The vessels carrying this amount of cargo would, no doubt, have to pay to the canal the same dues which they now pay to the Mersey Dock and Harbour Board. As these dues would more than cover the working expenses, it is clear, that, in order to pay 5 per cent, a traffic of less than two and a half millions of tons would be sufficient. But during the ten years from 1870 to 1880 the shipping trade of Liverpool increased by 2,886,742 tons, and it may safely be assumed that at least 3,000,000 tons of cargo were carried by that tonnage of shipping. Should a like ratio of increase be maintained during the present decade, by 1890 the shipping trade of Liverpool will exceed that of 1880 by nearly 4,000,000 tons.

A ship-canal to Manchester must therefore of necessity be a profitable investment, should it secure but a portion only of the natural increment of trade for which Liverpool, within ten years, will probably have to provide at great cost, and without any mitigation to the Lancashire industries of the existing excessive dock and railway charges. But as Manchester in every way will be the most convenient port and distributing centre for the largest portion of the imports and exports now passing through Liverpool, it is more than probable, that the traffic in the ship-canal will be such as to ensure a dividend of at least ten per cent. upon its cost. Referring to those who contend that the canal wont pay, the London *Times*, in a leading article on October 18th, 1882, says: "As the Duke of Bridgewater's Canal more than a century ago, and the Manchester and Liverpool Railway half a century ago, were met with the same objection—indeed all our canals and all our railways, to begin with—we need not think very much of it."

PROPOSED MANCHESTER SHIP CANAL.

INTRODUCTION.

EVIDENCE is not wanting that our competitors on the Continent and in America are sparing no pains in developing their industrial resources. As a means to this end they are paying the keenest attention to questions affecting transit, and no improvements likely to facilitate and cheapen transport are neglected. At the end of this pamphlet will be found a summary of what is being done in this direction on the Continent and in America.

The carrying out of improvements which increase the facilities for cheap transit cannot fail to stimulate mining, manufactures, and agriculture. To lessen the cost of transit is to increase the power of competition. The effects of transit charges in their incidence are precisely the same as those produced by the operation of hostile customs' tariffs. It is of no consequence to the consumer what elements make up the price of the commodity he requires. If he finds the price too high, what does it matter whether the article is made dear by a protective tariff or by the too great cost of transport? Reduce transport charges and you extend your operations to markets previously closed against you. To Lancashire, and to the manufacturing interests of the country generally, this question of the cost of transit is of the first importance.

The great question we have to consider as regards the projected ship canal to Manchester is—Will it place Manchester on a better footing as a great shipping centre, and thereby enable her merchants and manufacturers the better to sustain the competition of the world? If we are satisfied that this would be so, the next inquiries are—Is the scheme practicable as an engineering enterprise, and can it be carried out at a cost that will ensure the attention of capitalists as being a sound and profitable investment? As regards the advantages which may be expected to result, it is admitted on all hands that it would not only place existing interests in a better position, but that we should witness the inception of new departures and developments in local industries of a most surprising character.

The most opulent and powerful cities which have arisen in recent times are those which have sprung up on the banks of great navigable rivers, or on the sea-board; and in our own day and in our own country we have the splendid instance of Glasgow digging out a road to the sea and gaining by art those advantages denied to her by nature, which that great city had foreseen would as certainly accrue to her as had accrued to other cities through their natural positions in relation to the sea.

THE CHEAP TRANSIT PROBLEM.

> When we consider the enormous competition to which we were subjected by foreign nations, and the almost costless canal traffic extending in France to every market and centre of industry, he thought we should see the necessity of bestirring ourselves to make the best possible use of similar advantages in this country.—*From a speech by John Slagg, Esq., M.P., before the Manchester Chamber of Commerce, April,* 1882.

Influence of transit charges on the development of trade.

To turn out goods at a low figure from the looms of Lancashire is of little account unless you can also carry them at a low figure to the place where they are wanted; therefore dear transit charges cripple our producing power and place us at a serious disadvantage as against competitors enjoying cheaper facilities for carriage. We have, also, the same interest in obtaining cheap transport for our imports as for our exports; as reduction in cost of carriage of imports means more cotton, more wool, more silk, more tea, more sugar, more corn, more of every commodity in return for our exports. From the magnitude of the commercial and manufacturing interests of Manchester and its surroundings, this question of cheap transit is in the nature of things a prime consideration, yet it has scarcely received that share of attention which its important bearing on the prosperity of the district demands.

Disastrous effects of excessive railway rates.

It is becoming more evident every day that the industrial interests in this country can no longer afford to neglect the cheap transit problem. There are widespread complaints of the decay and, in some cases, total extinction of important industries, these disastrous effects resulting entirely from the too great cost of carriage between the producing centres and the consuming markets abroad. Moreover, the pernicious effects of the high rates charged for carriage are not confined to the foreign trade of the country; they operate just as mischievously on the far greater volume of trade arising from the production and distribution of goods intended for consumption in these islands. It has come to pass that the great bulk of the inland carrying trade is monopolised by the railways. The railway interest has grown to such an extent as to become a great power in the State. So secure in their monopoly do they feel, that, notwithstanding the obvious injury to trade arising from the operation of excessive railway rates, the railway companies have hitherto paid but little attention to the complaints of merchants. However, the loud clamours of the manufacturing, mercantile, and mining interests could no longer be resisted, and, with a view to special legislation, Parliament ordered a committee to investigate into the subject of railway rates. This committee sat during the session of 1881, and its labours were continued during the past session. The inquiries of this Parliamentary Committee on Railway Rates have resulted in the accumulation of a vast amount of evidence illustrative of the alarming effects on our trade which attend the existing monopoly of inland transit by the railway companies. Now, as it is doubtful whether much relief can be hoped for from the interference of the legislature, the question arises, would it not more effectually destroy this monopoly were the railways subjected to a strong, healthy competition, of a kind which they could neither bribe nor smother.

How Mr. Moon looks upon the competition of water carriage.

A conclusive answer to this question is afforded by one of the railway kings, Mr. Moon, the chairman of the London and North Western Railway Company, who stated at the last half-yearly declaration of dividend, that the sea and canals did more to bring down the railway rates than any competition among railways themselves. It is notorious that railway companies view with a jealous eye all attempts to develop inland navigation, and wherever they suffer from canal competition no expense is spared to obtain its control, thus depriving the public of the advantages which ought to result from such competition. It may, consequently, be taken for granted from the admissions and the avowed policy of the railway interest that in the development of inland waterways the public have the most powerful lever for the reduction of railway charges. But unfortunately for the public, owing to the difficulty of meeting with suitable natural conditions, it is only at a limited number of points that the railways can be subjected to water competition. This fact in itself is all the stronger reason why, where such natural advantages do exist, they should be turned to the best account.

Water carriage the cheapest mode of transit

Advantage of carriage by steamers.

In modern developments of inland navigation, we have to deal with conditions very different from those existing when the barge navigations were planned two centuries ago. Not only are the dimensions of commerce gigantic by comparison, but steam has completely revolutionised the conditions of inland navigation, and "steam navigation is beyond all controversy the cheapest known mode of inland transit." * From the greater extent of trade and the application of steam to navigation, it follows that in the adaptation of inland navigation to modern requirements provision must be made, wherever possible, for vessels of large capacity, and such waterways must be made navigable for steam vessels.

It being a well-ascertained fact that the percentage of working expenses to gross receipts is very much greater on carrying

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* *Vide* Evidence before Railway Rates Committee, House of Commons 1881-2

goods by rail than by water, it is to the interest of traders to promote inland navigation wherever practicable, and to effectually prevent railway companies from stifling or even controlling such waterways as may endanger their monopoly. The growing consciousness that railway control of waterways is being exercised in a manner prejudicial to the best interests of the country has led to steps being taken by the Chambers of Commerce of Manchester, Liverpool and elsewhere to induce the Board of Trade to prohibit railways from purchasing or having any voice in the management of what ought to be competing waterways. It is well known that the keen attention paid to the improvement of inland navigation in the United States and on the Continent of Europe has considerably reduced transport charges, and as a consequence the railways are stimulated to put forth their best efforts to give the public every advantage to be derived from an improved economy. The effect is to be seen in the much cheaper rates of freight abroad as compared with those of this country.

Effect of water competition.

English industries handicapped as compared with their foreign competitors.

In an article which recently appeared in the *Fortnightly Review*, the writer, Mr. Fleming, dealing with the relative merits of waterways and railways, maintained that the carriage of the raw materials used in the English iron industries costs nearly double what it would cost in France, Germany, Belgium, or Austria. Not long ago the *Statist* pointed out that, owing to the cost of railway transit to the shipping ports, the production of Bessemer steel rails has almost been extinguished in some parts of the country. As an illustration of this effect of transit charges on the heavy trades it is stated in the Annual Report (1881) of the Directors of Messrs. Charles Cammell and Co. Limited that the high charges of the railway companies have rendered necessary an important change in the conditions under which the steel rail industry is carried on. The Directors say that they have become satisfied that the rail mills must be alongside the blast furnaces, and these must be hard by the sea and must be in the locality where the ore is found. They will therefore remove their works from Sheffield to the coast of Cumberland, and thus avoid the excessive railway charges.

Centres of industry destroyed by high rates of transit.

A moral for Manchester.

In this movement of the steel rail industry from Sheffield there is, surely, a moral for Manchester. The high cost of inland transit is seriously affecting every department of industry. Besides our extensive cotton interests (which can ill afford the present excessive transit charges) we have a range of mechanical industries probably without parallel for variety and extent. "No country in the world," says Professor Leone Levi, "possesses factories for machinery so extensive as Manchester and its immediate neighbourhood" (*History of British Commerce*, p. 272). Are we to suppose that Manchester heavy trades will survive influences to which those of Sheffield succumb? The metal industries here, as elsewhere, will be compelled to seek some early solution of the cheap transit problem. How long can the cotton industry sustain the injurious influences of the charges exacted by railway rings?

Railway carriage an extravagant mode of transit for goods.

Independently, however, of the high rates maintained by "rings," it is becoming a serious question whether railway carriage on the most favourable terms is not an extravagant mode of transit where speed is not demanded. Water carriage can be effected at one-third the cost possible by rail. On the continent this is not only known but acted upon. English freighters are only just awakening to a sense of the importance of so economical a mode of transit.

The effects of the relatively cheaper water carriage are well instanced by what is going on upon the banks of the Clyde. A journal, well known for its clear and trenchant articles on questions affecting transit, the *Builder*, says:—"Some of the principal trades of England are being transferred to Glasgow or to Paisley, owing to the superior cheapness in transport, both of raw materials and finished goods, afforded by the Clyde. Pig-iron has long shown this influence. Heavy iron castings from Shropshire and steel rails from Sheffield followed. Now the shoe trade is leaving Stafford and Northampton for the valley of the Clyde; and finally the cotton-thread trade is leaving Lancashire for Paisley." With the advantages afforded by the Clyde, Glasgow bids fair to eclipse Manchester. Food and raw produce are landed there, and manufactures shipped at a nominal cost compared with the charges between Manchester and the seaboard. The advantages of cheap production secured to Glasgow are in great measure due to the energy of her citizens in bringing up the sea by the deepening of the Clyde. Glasgow thus holds the railways in check by the splendid highway she has made for herself to the sea.

Important movements of great trades due to heavy transit charges.

France is spending £40,000,000 sterling on inland waterways.

Manchester Guardian upon the French river and canal improvements, and their effect upon English industries.

If Great Britain is to keep pace with her foreign competitors, she cannot afford to neglect to carry out improvements in her waterways. As the result of an exhaustive enquiry by the Government of France into the comparative advantages of water transit and railway transit, the Chamber of Deputies have voted a progressive expenditure of £40,000,000 for the purpose of extending and improving the inland navigation of that country. Referring to the improvements being effected in France in this direction, the *Manchester Guardian*, in a leading article, says:—"The important point to consider is that the proposed new works embrace the construction of several new canals, and the adaptation of existing waterways for the passage of steamers of greater or less capacity. The carrying out of such improvements cannot fail to stimulate industry, especially in the mining and manufacturing districts, by increasing the facilities for transport. It will also have an important influence in controlling railway charges, especially on the lines worked by private companies. Both these conditions will, of course, increase the competitive power of France in the home and international markets; and it is in view of these results that our own waterways acquire a new importance."

Having established the paramount importance of inland water communication, we pass on to the main object of this pamphlet, viz., to point out the advantages which will follow from such improvements of the Mersey and Irwell rivers as will make them navigable for large vessels. By so improving these rivers Manchester has it in her power to secure advantages as great, nay, even greater than have accrued to Glasgow through the widening and deepening of the River Clyde. In an age which has seen the Suez Canal a triumphant success, and the Panama Canal in a fair way to completion, the perfect feasibility of making the Mersey and Irwell navigable between Liverpool and Manchester for the largest deep-sea vessels cannot be questioned.

The Lancashire Clyde.

EXISTING MODES OF TRANSIT BETWEEN MANCHESTER AND LIVERPOOL.

There are at least eight distinct lines of communication between Manchester and Liverpool. They are as follows:

(A) *The Public Highway.*
(B) *The Mersey and Irwell Navigation.*
(C) *The Bridgewater Navigation.*
(D) *The London and North Western Railway (viâ Newton).*
(E) *The London and North Western Railway (viâ Tyldesley).*
(F) *The London and North Western Railway (viâ Lymm).*
(G) *The Lancashire and Yorkshire Railway (viâ Bolton).*
(H) *The Cheshire Lines Railway (viâ Warrington).*

In the foregoing list we have:—

(1) *The Public Highway.*
(2) *Two Canals.*
(3) *Five Railways.*

The public highway.

In these days the relative amount of traffic on the public road between the two cities is so trifling that this line of communication might have been passed without reference were it not for the fact that the other modes of transit are so expensive that it is seriously proposed to organise a system of plate rail transit between Manchester and Liverpool and other towns.

The two canals.

Although water communication is indisputably cheaper than any other, the public derive no benefit from the existing canals between Manchester and Liverpool. One of these, the

Mersey and Irwell Navigation (which is a canalisation of the natural channels of these rivers) has been virtually rendered useless. The proprietors are unable to maintain a good depth of water owing to the enormous quantity of rubbish swept into the navigation in times of floods. Under the existing Conservancy Acts the powers do not appear to be effective enough to restrain the deposition of rubbish along the banks of the navigation. But if the proprietors could maintain this navigation in an efficient condition, the public would still derive no advantage from its use as against the railways. This will be apparent when it is explained that this navigation together with the Duke of Bridgewater's Canal (a most useful waterway) are virtually controlled by the railway interest, the proprietors of both—the Bridgewater Navigation Company—being mainly shareholders of the *Midland* and *Manchester, Sheffield, and Lincolnshire Railways.*

Bridgewater Canal controlled by railway interests.

As to the *Bridgewater Navigation Company*—to quote the language of a witness, Mr. Peter Spence, before the *House of Commons Railway Rates Committee* during the present session:—"Its directors are all or nearly all of them railway men; and both in the management of its tolls and in its carrying department it has throughout exhibited all the worst features of the railway policy. It has, in fact, in every way realised the fears expressed with regard to it by the *Railway Companies Amalgamation Committee* of 1872 (page xx). So far from promoting water competition with the railways, its representative upon the so-called Railway 'Conference' (or 'ring,' as I prefer to designate it), which controls the whole of the rates betwixt Manchester and Liverpool and elsewhere, has, in my experience, shown himself to be decidedly the most reactionary member of that body."

Mr. Peter Spence on the Bridgewater Canal policy.

It is clear then that the only effective waterway between Manchester and Liverpool has been so far subordinated by the Railway Companies to their own interests as to deprive the public of all the advantages which this cheaper mode of transit should afford. It is a glaring instance of the action of the railways with regard to the neutralisation of canal competition. Under these circumstances public attention for some time past has been directed to the proposal for so improving the Mersey and Irwell rivers as to connect Liverpool with Manchester by means of a waterway navigable for ocean-going vessels.

The public deprived of cheap transit.

ADVANTAGES OF THE PROPOSED NAVIGATION.

By a ship-canal betwixt Manchester and Liverpool the economy of carriage would obviously be far greater than by any other system, steam navigation being beyond controversy the cheapest known mode of inland transit. The Manchester ship-canal scheme has the approval of able engineers.—*Evidence given before the House of Commons Committee on Railway Rates. Session* 1881-1882.

The advantages which would result to Manchester and district by enabling her enormous shipping interests to be conducted on the spot are pretty generally admitted.

Saving in dock dues.

The shipment and discharge of goods in Manchester would be effected at a nominal cost, as compared with the charges arising from the freight between Manchester and Liverpool, together with the heavy port dues of the latter city. The dock and town dues, collected by the Mersey Docks and Harbour Board, amount to about one million sterling per annum. The annual cost of inland carriage between Liverpool and the Manchester district must amount to between £2,000,000 and £3,000,000. As by the proposed canal goods could be carried at less than one-third the rate charged by the existing routes, at least one million sterling would be saved to the commercial community by the ship-canal in the matter of inland carriage alone.* To this large saving must be added a very great proportion of the large sum levied yearly as dues by Liverpool on all the shipping, as well as on the goods they carry. The public cannot be too often reminded of the fact that except by making a ship-canal to Manchester there can be no escape from the excessive dues levied by the Mersey Dock and Harbour Board. Referring to the arrangement entered into with the Liverpool Corporation when the Dock Board was constituted in 1857, Mr. Findlay, of the London and North Western Railway Company, in his evidence before the recent Commission on Railway Rates, assented to the statement: "That the interest on nearly three millions sterling is practically a charge upon the traffic of the Lancashire district passing through Liverpool in and out, from which the trade itself *derives no benefit whatever* as far as I am aware."

Saving in carriage of over a million sterling.

Saving in forwarding chargos.

Merchants would be enabled to ship their goods under the direct supervision of their own staffs, and thereby save the commissions now paid to forwarding agents. In terminal charges (which form a heavy item in cost of transit), a further saving would be effected if goods could be taken direct to the ship in the lurries which collect the packages from the warehouses.

Saving in terminal charges.

Prevention of injury to goods.

The present railway system involves no less than seven separate handlings of the packages between warehouse and vessel. It is not to be wondered at, therefore, that as a consequence, the bales and cases of Manchester goods sometimes suffer serious injury in condition before they are shipped.

Certain extensive industries, which spring up wherever great facilities are afforded for shipping, would provide employment for a large amount of capital and labour. Chiefest among these would probably be shipbuilding. The contiguity of the great South Lancashire coalfield, the extent of the iron industries, and the presence of mechanical engineers of unrivalled skill, will ensure the foundation of extensive shipbuilding and its dependent industries, such as the construction of marine engines, boilers, propellers, ships' plates, anchors, tackle, and other appliances. It is our belief that, were the Irwell available for deep-sea steamers, the district between Manchester and Warrington would soon become famous for its iron shipbuilding.

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* It must be borne in mind that so far as foreign traffic is concerned. in a voyage of several thousand miles steamers will charge nothing extra for the additional thirty miles to Manchester, and the dues levied on the steamers will certainly not be heavier than they have now to pay to the Mersey Dock and Harbour Board.

Foundation of new industries.

Iron shipbuilding.

With the exception of a small one in Salford, there is not a sugar refinery in the Manchester district. The reason is not far to seek. It is cheaper to refine the sugar at the port of discharge and thereby save the greater expense involved in transmitting the bulkier raw material. When raw sugar can be brought here in the vessels themselves, sugar refining will at once become an important industry in Manchester.

Sugar refineries.

As soon as Manchester can be brought into direct water communication with the sea, it will marvellously stimulate the coasting steamer traffic between the Irwell and the numerous ports on the West and South coasts of England and Scotland. So long as the home produce merchants have to pay the heavy railway charges between Liverpool and Manchester, there is no great advantage in bringing garden and other produce from the coast by steamer to Liverpool and thence by rail to Manchester. Hence enormous quantities of food stuffs come into this city daily by rail. But let it be possible for steamers to bring their freight right up to our doors, and a vast quantity of what now comes by rail from the coasts of England and Scotland will find its way here by coasting steamers. As an illustration of the certain development of coasting traffic on a large scale, we quote the following from *The Times* of 14th April, 1882:—"At Penzance, yesterday, Mr. C. C. Ross, M.P., presided over a large number of market gardeners and buyers and others interested in the transit of garden produce to the North of England, to hear from Mr. Stevens, of the firm of Marshall Stevens & Co., of Liverpool, details of his proposal of carriage by steamer from Penzance to Garston Dock, and thence, *viâ* London and North-Western Railway, to all markets north of Birmingham. Mr. Stevens stated that he was prepared to run three or four steamers a week from Penzance to Garston during the season, the rates to be not more than from Jersey, and at least ten shillings a ton less than the railways at present charge. A resolution pledging support to the scheme was unanimously carried." The advantages of Garston over Liverpool are as nothing compared with the advantages which would result if these coasting steamers could bring their produce to so important a food centre as Manchester. Again,

Development of coasting traffic.

Recent illustration of this.

it is notorious that many vessels are now loaded at London instead of at Liverpool, partly because the heavy railway tariff between here and Liverpool does not give that port the advantages over London in regard to Manchester exports to which her proximity to the manufacturing districts entitles her. When steamers can take in cargo at the wharves in Manchester, many vessels which now load in London will find it much to their advantage to load at the port from which the goods are originally despatched.

Steamers attracted from the Thames to load at Manchester.

Additions to population and extension of the city.

The general extension of local industry would considerably add to the population of Manchester and Salford. These additions to population must of necessity augment the returns of tradesmen in every department, owing to the extra demand for the necessaries of life. The provision of dwellings for the additions to population, and the erection of new works, warehouses, quay extension, etc., would infuse new life into the building and timber trades.

All the advantages conferred upon export merchants will extend to those engaged in the import trade, which, it may be mentioned, far exceeds in importance the extent and value of the export trade. Just as the reduced cost of shipment will extend our operations in foreign markets, so will the reduction in the charges attending importation cheapen raw materials and the enormous quantities of food products.

Cheaper food supply.

It was given in evidence last year before Parliament that Manchester corn merchants frequently found it cheaper to order vessels from America laden with grain to the ports of Barrow, Fleetwood, and even Hull, rather than to Liverpool, even though the bulk of the cargo was ultimately destined for the neighbourhood of Manchester. There is but one opinion on the Manchester Corn Exchange as to the enormous quantities of grain which would break bulk in this city were grain-laden vessels able to reach the docks of the ship canal.

The output of coal from the Lancashire pits is very much restricted by the competition of sea-borne coals from Wales. The coal raised in Lancashire is mainly used for home consumption. Until the cost of carriage to the sea is greatly reduced the coal owners cannot look forward to any great expansion of the foreign trade, or of the demand for coals for steam vessels. The pits from which the main supply of Lancashire coal to the Liverpool market is obtained are quite close to the Irwell, and a canal system proceeds direct from the levels of the coal workings to the river bank. It would obviously effect an enormous saving were vessels coaled so near to the mines, instead of the coal being sent to Liverpool by the roundabout barge canal of fifty miles as at present.

Development of the South Lancashire coal trade and cheaper coaling of vessels.

In like manner the South Yorkshire coal, which makes an admirable steam coal, has for this purpose been much handicapped by reason of its distance from the sea-board. It is confidently expected, however, that the ship canal will be the means of greatly stimulating the output of this coalfield for the use of steam vessels and for export, and in view of this the colliery proprietors of South Yorkshire are keenly watching the progress of the present movement.

Development of South Yorkshire Coal Field.

Cotton ships being able to discharge their cargoes in Manchester would probably lead to the cotton market being held on the Manchester Royal Exchange, which, looking at the relation of Manchester to the cotton districts, would seem to be the most natural and appropriate arrangement. This change will be facilitated by the fact that the raw material will be laid down in the docks of this city, thirty-two miles nearer than Liverpool to the spinning mills at Oldham, Stockport, Ashton, Rochdale, &c., at actually less than the cost on the quays at Liverpool. Few of the spinners in Lancashire who do not import, but only buy from the Liverpool broker, are aware that between the ship's hold and the railway truck at Liverpool every ton of cotton has to bear a charge of 8/1¼—3/6 of which is for dock and town dues. The traffic manager of the London and North Western Railway Company has stated that with the exception of London and the Garston New Dock, this is more than double the charge for similar service incurred at any other port in the United Kingdom. As cotton could be carted from Manchester to the towns above-mentioned at a moderate cost, it thus follows that by importing cotton via Manchester instead of Liverpool, the spinners will effect a saving in carriage and dock charges of from 8/- to 11/- per ton. Liverpool terms have induced Oldham spinners to try buying cotton in Bremen and Havre. Purchases made in those places and imported *viâ* Hull, after paying heavy railway charges from Hull to Oldham, have effected a saving of one farthing per lb. in the price asked for the same quality of cotton in Liverpool. In connection with the probable transfer of the cotton market to Manchester, it may be mentioned that among other efforts of the Oldham spinners to avoid the heavy dues levied by Liverpool, they arranged for a consignment of cotton to Garston, a plan which they found to effect a great saving of charges.

Removal of the cotton market from Liverpool to Manchester.

Great saving in the carriage of cotton.

The capacious channel required for the ship canal would provide such an outlet for the rainfall as would entirely prevent the possibility of floods in the lowlands between Manchester and Warrington.

Prevention of floods.

THE MERSEY AND THE IRWELL AS THEY ARE, AND AS THEY MIGHT BE.

> The obstacles to the improvement of the Irwell between Warrington and Manchester are so slight as to excite a smile in an engineer of the present time.—*Baines, in " Lancashire and Cheshire Past and Present."*

The existing barge navigation of the *Mersey and Irwell* was

Steps taken in 1720 to improve Mersey-Irwell rivers.

undertaken under very extensive powers, conferred by "*An Act for making the Rivers Mersey and Irwell navigable from Liverpool to Manchester*, 1720-21 (7 *Geo. I. cap.* 15)." By this statute thirty-five inhabitants of Manchester and three inhabitants of Liverpool were authorised to make these rivers navigable, and to dredge, widen, or straighten them, as might be considered necessary. By a further Act of Parliament, obtained in 1794 (34 *Geo III. cap.* 37), the proprietors were incorporated under the title of the "*Company of Proprietors of the Mersey and Irwell Navigation*," and the powers conferred under the original Act were also confirmed. As previously explained, the Bridgewater Navigation Company are the present proprietors of the *Mersey and Irwell Navigation.* But owing to the liability of these rivers to droughts and sudden floods, the Bridgewater Company make little use of this waterway, excepting when the Duke of Bridgewater's Canal is being repaired or is blocked by ice. It is notorious that under existing conditions the *Mersey and Irwell Navigation* is practically valueless to its present proprietors.

Present Irwell-Mersey navigation practically useless for transit purposes.

Proposal in 1824 for ship-canal between Manchester and the river Dee, *viâ* Frodsham, Lymm, and Altrincham.

So far back as 1824 a proposal for a Manchester Ship-Canal was sufficiently matured to lead to an application to Parliament for powers in the session of 1825. The route to be followed was from the mouth of the Dee, crossing the estuary of that river at Parkgate and proceeding thence by way of Frodsham, Lymm, and Altrincham, entering Manchester from the south through Didsbury. This scheme, whatever its advantages, met with most determined opposition. The Bill was thrown out by Parliament, not however upon its merits, but because the orders of the House had not been complied with, neither had any proper survey of the route been made or plans prepared. Under the circumstances it is not at all wonderful that the Bill was rejected.

Its rejection by Parliament.

In 1840 the proprietors of the *Mersey and Irwell Navigation* instructed several engineers to report upon the navigation and prepare plans for its improvement. Among others a report was prepared by H. R. Palmer, Esq., at that time Vice-President of the Institute of Civil Engineers. The main feature of Mr. Palmer's proposal was the construction of five locks of large capacity between Warrington and Manchester. These locks were to accommodate vessels of 400 tons. Viewed in relation to the requirements of our trade at that time, and considering the character of the shipping of that day, Mr. Palmer's scheme could scarcely be condemned as impracticable. But those who forty years ago proposed to improve the *Mersey-Irwell Navigation* in the manner described did not anticipate:—

Mr. Palmer's scheme in 1840 for canal with locks.

(1) THE EXTRAORDINARY EXPANSION OF OUR TRADE.

	1840.	1880.
Total value of Foreign Trade of United Kingdom	133,312,740	697,644,031

Increase, 423 per cent.

(2) THE CONSTRUCTION OF VESSELS OF ENORMOUS SIZE.

Relative Dimensions of Largest Steamships.

Great change in shipping trade since 1840.

	Vessel.	Length.	Breadth.	Depth.	Tonnage.	H.P.
1840	Great Western	236ft.	35⅓	23⅙	1,321	450
	British Queen	275	40	27½	2,016	500
	President	265	41	23½	1,840	500
1881	Alaska	500	50	38	6,932	1,800
	City of Rome	560	52·3	37	8,415	1,500
	Servia	515	52·1	37	7,392	1,000

(3) THE WONDERFUL DEVELOPMENT OF STEAM NAVIGATION.

1840	87,000 tons.	1880	2,728,468 tons.

(4) THE RAPID DISPLACEMENT OF SAILING TONNAGE BY STEAM TONNAGE IN RECENT YEARS.

Sailing Vessels.		Steamers.	
1866	4,903,652 tons.	1866	875,685 tons.
1880	3,851,045 „	1880	2,728,468 „
Decrease	1,052,607 „	Increase	1,852,783 „

Mr. Palmer's plan unsuited to modern shipping.

The influence of these changes has completely revolutionised the conditions to be fulfilled by any adequate plan for the improvement of the waterway between Manchester and Liverpool. Not only must the navigation be wide enough and deep enough to allow of vessels of 5,000 tons to pass each other at all times with ease and safety; but if locks are essential, they must be of a size sufficient to accommodate that class of vessel. It is stated that locks can be devised which will allow vessels of large tonnage to pass through them in ten minutes. A statement has been made that vessels will take two days in doing the distance between Manchester and Liverpool. The absurdity of this will be evident when it is remembered that as far back as 1829 passenger barges did the distance from Manchester to Liverpool in seven hours, passing through ten locks *en route.* With modern steamers and only three locks—and these of the most scientific construction—the distance will easily be covered in five hours. It must not be forgotten, too, that all vessels using the docks at Liverpool have to pass through one and sometimes two locks.

Effect of proposed navigation in removing the bar at mouth of the Mersey.

A most important feature in connection with the projected enlargement of the tidal channel to Latchford calls for special notice—the increased depth of water on the bar in the Queen's Channel, at the mouth of the Mersey. This would be secured by the effectual scouring of the bar by the much stronger ebb and flow which would result from the augmented volume of tidal water passing up and down the improved channel. Thus, large vessels which now regularly stand off the bar, waiting for the flood tide, would be able to enter Liverpool earlier than at present.

Opposition of vested interests.

But it will be asked, what of the opposition of Liverpool and of the railway companies? Vested interests always complain, and doubtless those of Liverpool and the railways would show fight. But their combined opposition, however formidable, cannot prevent Manchester having access to the sea if she once makes up her mind on the subject. We have reason to believe, however, that there is a much better feeling towards Manchester on this question in Liverpool than is popularly supposed. Moreover, should the increase in the shipping trade of Liverpool between 1880 and 1890 be at the same rate as that between 1870 and 1880—40 per cent.—by the end of the present decade Liverpool will have to build more docks, even though the docks at Manchester should have a traffic sufficient to pay a dividend of 10 per cent on the estimated cost of construction of the proposed canal. The public scarcely realise at what an enormous rate the shipping trade of this country is expanding.

Opposition futile if Manchester is determined.

Present overcrowded state of Liverpool docks.

Every few years Liverpool has to keep adding to her dock accommodation, and if this Ship Canal be not undertaken she will be obliged in another five years to spend more in dock extension than would cover the cost of the proposed waterway to Manchester, and that, too, without any equivalent advantage to the community. Even now the docks at Liverpool are overcrowded, as will be seen from the following paragraph from the *Manchester Guardian* of 12th May, 1882 :—

> DOCK ACCOMMODATION AT LIVERPOOL.—At a meeting of the Mersey Docks and Harbour Board yesterday, Mr. Guion stated that the pressure on the Board's accommodation for vessels was unprecedented, and notwithstanding the large area of dock accommodation recently opened at the north end of the city by the Prince and Princess of Wales, the Board was still short of the space that was required at their hands. Under these circumstances it had been arranged that the Herculaneum Dock should be devoted to the use of shipowners pending the decision of the Board as to deepening it.

PROSPECTS OF MANCHESTER AS A PORT.

> Any improvement which will enable ocean-going vessels to discharge their cargoes in a commodious wet dock in Manchester would form an epoch of such magnitude in the history of Manchester as would quadruple her population, and render her the first as well as the most enterprising city in Europe.—*The late Sir Wm. Fairbairn on the Improvement of the Irwell.*

Shipping activity of Manchester.

In considering the prospects of Manchester as a port, it is believed that the shipping activity of Manchester herself affords more than sufficient trade to ensure the financial success of the proposed ship canal. Besides being the general emporium of the cotton trade, and the seat of mechanical operations on a scale unequalled by any city in the world, a variety of miscellaneous industries are carried on which figure extensively in the trade returns of Liverpool, London, Southampton, and the Humber ports.

But in addition to the Manchester shipments it is reasonable to calculate upon a large accession of business arising from the imports and exports of the great band of industrial towns by which Manchester is surrounded, and also

Accession of business from the West Riding and the Midlands.

those of the great manufacturing districts of West Yorkshire and the Midlands. A reference to the map accompanying this pamphlet will make it clear beyond question that Manchester would be in every way more convenient as an outlet for the industries of these districts and as their food depôt than the port of Liverpool.

Extent of the cotton industry.

The cotton industries of North-East and South-East Lancashire sustain a population of nearly 2,000,000, and their relationship to Manchester is of the closest possible kind. Practically this city is the agency for the disposal of the whole of the products of the mills of Lancashire, and almost all the cloth and yarn intended for export has to come to Manchester before it is shipped. It will be seen, too, that Manchester lies just midway between Liverpool and the great manufacturing towns of the West Riding (the population of which is 2,175,134), and in fact the greater portion of the enormous traffic between these places has to pass through this city or its immediate vicinity.

Traffic between Liverpool and West Riding passes through Manchester.

In considering the probable prospects of Manchester as a shipping port, the figures contained in the following table will be found instructive :—

ANALYSIS OF LIVERPOOL EXPORTS, 1880.

Cotton Manufactures	£43,458,806
Machinery, Mill Work, and Hardware ...	3,841,223
Metals	10,684,123
Linen and Jute Manufactures	3,819,293
Woollen Manufactures	6,298,165
Earthen and China Ware	1,371,607
Chemicals and Alkali	1,973,751
Haberdashery and Millinery	1,338,352
Sundry Exports	11,244,409
Grand Total	£84,029,729

More than half the value of Liverpool exports are cotton manufactures.

It is clear from the foregoing analysis that by far the larger proportion of Liverpool exports must proceed from the Manchester district either directly or in course of transit.

As a further illustration of the extent of the interests of Manchester and the industrial districts around, the following tables show the distribution of the five leading manufactures at the principal ports :—

DISTRIBUTION OF THE FIVE LEADING MANUFACTURES AT THE PRINCIPAL PORTS.

Manufactures.	Exported from			
	Southampton.	Humber.	Thames.	Mersey.
Cottons	£4,696,762	£8,587,970	£13,035,287	£43,458,806
Metals	316,814	2,017,573	6,609,900	10,684,123
Woollens	421,745	7,519,437	4,434,082	6,942,402
Linen and Jute	204,151	1,008,118	1,334,478	3,819,293
Machinery and Hardware	423,535	3,807,245	2,698,129	3,841,223
	£6,063,007	£22,940,343	£28,111,876	£68,745,847

SUMMARY SHOWING RELATION OF LIVERPOOL EXPORTS TO GENERAL EXPORTS SO FAR AS REGARDS THE FIVE PRINCIPAL BRANCHES OF MANUFACTURING INDUSTRY (1880).

Liverpool	£68,745,847
London Hull Southampton	57,115,326
All other Ports	28,298,487
Total Exports (1880) of the Five leading Manufactures from United Kingdom	£154,159,660

AGGREGATE FOREIGN TRADE OF LIVERPOOL COMPARED WITH AGGREGATE FOREIGN TRADE OF UNITED KINGDOM.

	Imports.	Exports.*	Total.
Liverpool (1880)	£107,460,187	£84,029,729	£191,489,916
United Kingdom (1880)	411,229,565	223,060,446	634,290,011

* Exclusive of Re-exports.

Liverpool has nearly one-third of entire foreign trade of the country.

As will be seen from the foregoing comparison, very little less than *one-third* of the entire foreign trade of the United Kingdom was secured by Liverpool in 1880. To put the matter in another form, the relation of Liverpool trade to the trade of all the other ports taken together was as follows for 1880:—

Total Foreign Trade of Liverpool	£191,489,916
Total of all other Ports of the United Kingdom	442,800,095

Importance of Manchester as a food-distributing centre.

Extensive as are the exports of the Manchester district, of far more consequence are the imports for the food supply of the district of which Manchester is the distributing centre. The population of the city, including Salford, taking the limits of the poor-law assessment, is given by the Manchester Statistical Society at 709,000. This computation is adopted because of the census returns only including the municipal areas of Manchester and Salford. A radius of 40 miles from Manchester includes a greater population than any similar area in the United Kingdom, the population of North-East and South-East Lancashire, Mid and East Cheshire, Derbyshire, North Staffordshire, and the West Riding of Yorkshire, being in round numbers 5,500,000. Manchester, therefore, as a convenient food-distributing centre, has no equal in this country. The subjoined table gives the food imports into the United Kingdom, in 1880, of which a very large proportion came in at the port of Liverpool.

ANALYSIS OF FOOD IMPORTS (UNITED KINGDOM, 1880).

Animals	£10,060,396
Bacon, Ham, Beef, &c.	16,439,567
Butter, Cheese, and Eggs	19,467,999
Corn	62,857,269
Sugar	22,981,086
Tea and Coffee	18,474,528
Wines and Spirits	8,562,067
Rice, Fish, Fruit, and Sundries	15,515,852
Grand Total	£174,358,764

Manchester as a food-distributing centre.

The cost of carriage of food stuffs is of prime importance to Lancashire and the West Riding, as will be evident from the following considerations. The population of these districts being mostly industrial they are dependent almost entirely upon extraneous sources for their food supplies. Taking the counties of Lancashire, Cheshire and the West Riding, it will be found that there is only one acre of corn under cultivation for every 15.3 of the population, as against one acre for every 3.53 of the population of England and Wales, and one acre for every 8.3 of the population of the Metropolitan counties of Middlesex, Surrey, Essex and Kent, which include the great City of London with its nearly four millions of inhabitants. In like manner, whilst Lancashire, Cheshire, and the West Riding have but one acre of garden produce to every 1329 inhabitants; England and Wales have one acre to every 586, and the Metropolitan counties one acre to every 338 inhabitants. As regards animal food reared in our own district, we in the north are also at a disadvantage compared with the country generally and with the Metropolitan counties. It will thus be seen that to a very much greater extent than any other section of the population the industrial districts of Lancashire and West Yorkshire have to obtain their food supplies from distant parts of the country—especially from the South and West Coasts of England, from Scotland and Ireland, and from abroad. The pre-eminence of the Lancashire manufactures has been largely owing to her being able to buy her food and raw produce in the cheapest markets. Now that all the leading countries in the world are striving their hardest to compete with her in their own and foreign markets, it behoves Lancashire to look to everything which will increase her power of competition. Reduced transit charges will materially aid her in doing so, as a reduction of a few shillings per ton on the enormous quantities of food and raw produce which she imports must in the aggregate amount to a very large sum per annum.

Manchester largely dependent upon foreign food supplies.

The ship-canal will cheapen food and raw material.

In discussing the prospects of Manchester as a port, we have so far only considered that reasonable proportion of business which Manchester may fairly expect to secure according to the existing volume of trade. But looking at the enormous expansion of the foreign trade of the United Kingdom during recent years, it is not unreasonable to anticipate a further extensive development in the immediate future. The figures given below will afford some idea of the development during the fifteen years 1866 to 1880 inclusive. In spite of serious famines which affected the purchasing power of eastern markets, and of the hostile tariffs intended to exclude Manchester goods from the markets of Europe and America, there has been an enormous increase in the exports of cotton piece goods, and there is every reason to suppose that this tendency to increase will continue.

Prospective magnitude of Manchester interests.

EXPANSION IN THE EXPORTS OF COTTON PIECE GOODS.

1866...	2,575,698,138	yards.	INCREASE.
1872...	3,537,985,311	„	on 1866=37 per cent.
1881...	4,495,645,000	„	„ 1872=27 „ „

The increase in 1881 over 1866 is 74·5 per cent, so that at this rate by 1886 the export of cotton cloth from Lancashire will have doubled itself in twenty years.

Increases per cent in 15 years.

GENERAL DEVELOPMENT OF DOMESTIC & FOREIGN TRAFFIC OF THE UNITED KINGDOM, 1866-1880.

Value of foreign trade, 31 per cent.

GROWTH OF FOREIGN TRADE OF UNITED KINGDOM.

Year.	Imports.	Exports.	Total.
1866	... £295,290,274	... £238,905,682	... £534,195,956
1880	... 411,229,565	... 286,414,466	... 697,644,031

Ocean transit, 88 per cent.

OCEAN TRANSIT.

Year.	Entries. Tons.	Clearances. Tons.	Total. Tons.
1866	... 15,612,170	... 15,650,280	... 31,262,450
1880	... 29,073,535	... 29,662,508	... 58,736,063

Coasting traffic, 40 per cent.

COASTING TRAFFIC.

1866 ... 18,598,120 tons. .. ... 1880 ... 26,022,549 tons.

Railway goods traffic, 72 per cent.

GROSS RECEIPTS FROM RAILWAY GOODS TRAFFIC.

1866, £20,768,429 ... 1880, £35,761,303 ... Increase, £14,992,874

THE REMARKABLE DEVELOPMENT OF LIVERPOOL.

What Liverpool was in 1708.

The first wet dock in the United Kingdom was constructed at Liverpool under powers conferred by an Act of Parliament obtained in 1708. At that time Liverpool was a town of insignificant extent. The Lancashire cotton trade was in its infancy. The total quantity of raw cotton imported yearly averaged about 3,000 bales, chiefly imported at London. The subjoined table shows that Liverpool is essentially a growth of the present century. It exhibits an increase of commerce unequalled by any other port, to which wonderful increase the industries of Manchester have mainly contributed.

What Manchester has made her.

FIGURES EXHIBITING THE INCREASE OF LIVERPOOL COMMERCE.

Year.		Tonnage of Vessels.		Dock and Town Dues.
1801	......	459,719	......	£28,365
1811	......	611,190	......	54,752
1821	......	839,848	......	94,556
1831	......	1,592,436	......	183,455
1841	......	2,425,461	......	175,506
1851	......	3,737,666	......	246,686
1861	......	4,977,272	......	611,006
1871	... ..	6,131,745	......	789,031
1881	......	7,893,948	......	966,281

THE CLYDE IMPROVEMENTS AND THE RISE OF GLASGOW.

What Glasgow has done for the Clyde.

All these things were accomplished—how? They were accomplished by great and indomitable perseverance—by that extending industry which has brought the sea up to the Broomielaw, which was, at the end of last century, I believe, only a foot or two deep with water, and now there has been accomplished for the city that which nature gave to the Thames. These are the works which the citizens of Glasgow have achieved, and they have reaped their due reward in that splendid commerce she now possesses.—*From a speech delivered in Glasgow in October*, 1881, *by Sir William Harcourt.*

The saying of her citizens that "the Clyde made Glasgow," is abundantly proved by the following statistics, which show in a concise form the marvellous results which have followed from the improvement of the Clyde Navigation.

Statistics Illustrative of the Development of Glasgow.

What the Clyde has done for Glasgow.

Year.	Length of Quays. Yards.	Area of Harbour. Acres.	Total Tonnage Entered. Tons.	Revenue of Clyde Trust. £	Population.
1801	382	4	...	3,401	77,385
1811	697	7	...	4,755	100,749
1821	697	7	...	8,070	147,043
1831	1,543	14	732,327	18,932	202,426
1841	1,973	23	1,142,373	49,666	255,650
1851	3,591	51	1,446,606	68,875	329,096
1861	4,376	70	1,504,220	105,769	395,503
1871	5,604	75½	2,049,708	164,189	477,710
1881	10,544	153	3,057,533	248,061	668,859*

* Including population (157,327) of suburban burghs.

Growth of Shipbuilding on the Clyde.

Year.	Tons.	Year.	Tons.	Year.	Tons.
1861 ...	66,801	1871 ...	196,229	1881 ...	341,022

Clyde shipbuilding worth over ten millions per annum.

Last year the value of vessels built on the Clyde must have exceeded ten millions sterling.

THE RIVER TYNE IMPROVEMENTS.

These results—of national as well as of local importance—establish the Tyne as the most noteworthy example of river improvement within the bounds of the United Kingdom. I congratulate the Commissioners upon this issue, for I cannot doubt that they will readily accept an improved river navigation, increasingly occupied river boundaries, an expanding revenue, and a promising future, as an ample return for all the trouble they have taken in boldly and persistently carrying out their well-considered plans for river improvement.—*Report of Captain E. K. Calver, R.N., on the Improvements effected in the River Tyne.*

Great improvements in the river Tyne since 1860.

One of the most remarkable examples of natural obstruction to inland navigation being overcome by enterprise and engineering skill is afforded by the River Tyne improvements, which have been effected between 1860 and 1880. On the Tyne, so lately as 1860, vessels of moderate size and draught were detained for weeks after loading, unable to get to sea even at high water. Able engineering overcame all difficulties, and now large vessels reach Newcastle with ease, whereas vessels drawing six feet of water would before these improvements have stranded. In 1860 the depth of water in Newcastle Harbour varied from 3½ feet to 8½ feet at low water, whilst in 1879 the depth of water, owing to the artificial improvement of the Tyne, varied from 20 feet to 25 feet at low water, or from 35 feet to 40 feet at high water spring tides. In 1860 the depth of water on the Tyne *Bar* was not more than 6½ feet at low water. In 1879 the depth of water at the entrance to the Tyne was not less than 22 feet at low water, or 37 feet at high water spring tides. In point of fact there is now no bar at the mouth of the Tyne, there being a clear track from the sea of 27 feet.

TABLE SHOWING RECENT DEVELOPMENT OF THE TYNE PORTS:—

	1861. Tons.	1871. Tons.	1881. Tons.
Total Tonnage clearing......	3,196,781	4,897,878	5,908,886
Total Exports of Coal Coastwise and Abroad...	4,503,363	6,212,906	8,194,578
Gross Revenue of the Tyne Commission	£74,985	£164,169	£261,186
Population of Tyne Ports...	227,926	298,644	500,000*

* Estimated population within the limits of the jurisdiction of the Tyne Commission.

Extraordinary results of deepening the Tyne.

As indicating the splendid results which have followed upon the deepening of the Tyne, the subjoined figures are of special significance.

	1861.	1871.	1881.
Number of Vessels of 500 tons and upwards cleared from the Tyne...	246	2,542	4,625

An increase from 1861 to 1881 of 1780 per cent.

Since 1860 shipping of Glasgow and the Tyne Ports increased in far greater ratio than that of Liverpool.

If the statistics of the ports of Liverpool, Glasgow, and the Tyne be examined, it will be found that from 1861 to 1881, whilst the shipping of the natural port of Liverpool has only increased 59 per cent, that of the Clyde has increased 103 per cent, and of the Tyne 85 per cent. The revenues of the Mersey Dock and Harbour Board in the same period have also shown less elasticity than those of the other two ports, the increase having been 58 per cent as compared with an increase of 125 per cent. in the revenue of the Clyde Trust, and 248 per cent. in that of the Tyne Commissioners. When it is remembered that for all practical shipping purposes the Tyne and the Clyde are artificial rivers, these figures are most significant.

PROGRESS OF THE SUEZ CANAL.

The Suez Canal, which artificially connects the waters of the Red Sea and the Mediterranean, is 87 miles in length. The distance of 87 miles is about five times the distance intervening between Manchester and Warrington. As the Mersey-Irwell channel widens considerably just below Warrington, the excavated portion of the proposed Manchester Ship Canal would not be more than one-fifth of the length of the Suez Canal. Notwithstanding that the project of the Baron Ferdinand de Lesseps was considered by the wise men of the day a purely chimerical one, the canal is an accomplished fact. This splendid monument of engineering skill has proved a great commercial success. The annual tonnage passing through the canal already exceeds the most sanguine predictions of its promoters, and to-day, in less than thirteen years after its completion, men are seriously contemplating the doubling of this canal or the construction of a second one.

Suez Canal at first condemned as a wild scheme.

Now so successful that a second one is contemplated.

The Suez Canal is, of course, not quite a parallel case to the Manchester Ship Canal, but as nearly all Englishmen predicted it would never be made, and if made that it would never pay, it is interesting to note how astonishingly the increased facilities for trade, opened up by this stupendous work, succeeded in revolutionising the whole system of our commerce with the East, bringing with it a development of traffic in the canal which is unparalleled in the history of any similar enterprise.

Effect of the Suez Canal in revolutionising trade with the East.

GROWTH OF SUEZ CANAL TRAFFIC (1870–1881).

Year.	Ships.	Tons.	Receipts in Francs.
1870	486	435,911	5,159,327
1871	765	761,467	8,993,732
1872	1,082	1,439,169	16,407,591
1873	1,173	2,085,072	22,897,319
1874	1,264	2,423,672	24,859,383
1875	1,494	2,940,708	28,886,302
1876	1,457	3,072,107	29,974,998
1877	1,663	3,418,949	32,774,344
1878	1,593	3,291,535	31,098,229
1879	1,477	3,236,942	29,688,060
1880	2,026	4,344,519	39,840,487
1881	2,727	5,794,401	51,274,352

MARITIME CANAL ENTERPRISE ABROAD.

France.—At the instance of M. de Freycinet, the Government have recently voted £40,000,000, and in the opinion of a well-known writer in this country upon transit questions, the French Government, before they have exhausted all their improvements in water-carriage, will have spent £200,000,000 for the improvement of the systems of inland navigation in that country. The attention of the French Government is being paid to the consideration of a projected canal for the connection of Paris with Dunkirk, so as to increase the facilities for traffic in the departments of the Nord, Calais, the Somme, and the Oise. By this canal a better outlet would be afforded for the manufactures of Valenciennes, Lille, Douai, and Roubaix, and for the produce of the rich agricultural districts of the north-east. Besides the important scheme just mentioned, the French Government have also under consideration a number of projects for widening and deepening the Seine, the improvement of the ports of Rouen and Havre, *and the construction of a great ship-canal from Bordeaux on the Atlantic sea-board to the Mediterranean.* The last-named project is of so colossal a character as to fairly take away one's breath. It would extend from Bordeaux, by way of Toulouse, to Narbonne, a distance of 270 miles. It would be of sufficient capacity to accommodate ships of war, and at its highest point would be 500 feet above the level of the sea. The supply of water would be chiefly derived from the river Garonne. The estimated cost of this great work is put down at £56,666,160 in a report furnished by the committee appointed to investigate into the matter by the French Government.

Great ship-canal from Atlantic to the Mediterranean, estimated cost £56,666,160.

Holland.—The great ship-canal connecting Amsterdam with the North Sea has proved a great success. It was opened for traffic on 30th October, 1877. The old route from the North Sea to the port of Amsterdam was by the Zuyder Zee. But that shallow gulf is beset by furious storms, and its navigation is hampered by great sandbanks. These obstacles to navigation led in 1819 to the construction of the North Holland Canal from Amsterdam to Nieuediep at the Helder. This canal has been superseded in a great measure by the great canal just referred to, which provides a much more direct access to the sea, and allows of the passage of vessels of the largest size. As an engineering enterprise the North Sea Canal was a more formidable undertaking in some respects than the famous Suez Canal, difficulties having to be overcome from which the Suez Canal was entirely free. Among other schemes for improving communication in Holland, money has been voted for the construction of a maritime canal between Amsterdam and Rotterdam, and the construction of a canal has been sanctioned which is to proceed from Amsterdam to Utrecht, and thence to the Merwede river, near Gorcum.

The great North Sea ship-canal.

Maritime canal to Brussels.

Belgium.—Canal construction is just now being much considered in Belgium. Quite lately a meeting was held on the Brussels Bourse to discuss a proposal for a maritime canal from Brussels to the Scheldt. At present the Belgians have to suffer the competition of French coal-owners, the coal raised at the Pas-de-Calais pits being introduced into Belgium as far as Ghent, by the cheap navigation afforded by the River Lys. The competition of Westphalian coal and iron is also very severe, and will become still more so when the canal from the Rhine to the Meuse is opened. Brussels is not more than twenty-five miles above Antwerp; and the Belgians say the construction of a maritime canal to Brussels will enable them to add new markets for their productions, as the present outlets for their manufactures are becoming deplorably insufficient. Great improvements of the harbour accommodation of Ostend and Antwerp are being carried out. At Antwerp, whole lines of streets which front the Scheldt are being demolished in order to construct a magnificent extension of the quays. The projects which the Belgians have on hand in connection with the extension of docks, quays, and the improvement of canals and rivers, amply prove that they are fully alive to the necessity of keeping pace with the requirements of commerce.

Canal for connecting the Rhine, Elbe, and Weser.

Germany.—In the Royal Speech at the opening of the Prussian Landtag, a hope was expressed that the projected maritime canal for the connection of the Rhine, the Weser, and the Elbe would be speedily begun. The construction of the suggested canal would provide the Rhenish Westphalian coal and iron districts with a cheap waterway to the North Sea ports, and it is expected would secure a brilliant future for the Westphalian coal industry. The actual construction of the canal is expected to cost about £5,600,000, independently of £1,800,000 which is to be expected on the Elbe-Spree Canal, making the total estimated expenditure £7,400,000, the greater part of which is to be laid out during the next four years. As illustrative of the public spirit manifested in these enterprises, it may be mentioned that all the land required is being given free of cost by the municipalities, communes, and provinces through which the canals will pass.

Great canal between the Danube and the Oder.

Austria.—In Austria, as elsewhere on the continent of Europe, the prime importance of developing inland navigation has impressed itself on the public mind. It is felt that the hindrances to which navigation on the Danube is subjected prevents Austria-Hungary from competing successfully with America in the supply of the world's markets with corn. Public attention is therefore being directed to the necessity of at once materially improving the Danube navigation. It is proposed to cut a canal between the Danube and the Oder, thus connecting the Black Sea with the Baltic. A scheme of even greater magnitude, which would afford another line of com-

Proposal to connect Baltic and Black Seas by canal across the Continent.

munication between the Black and Baltic Seas, is the cutting of a canal to effect the juncture of the Dniester and the Vistula, bringing Odessa and Dantzic into direct communication. The most sanguine views prevail as to the realisation of this project, although the cost is estimated at £20,000,000.

America.—The Americans, not content with the most magnificient system of natural waterways in the whole world, are leaving no stone unturned to improve and extend them by artificial canals. "In view of the anticipated competition on the completion of the Canadian canals, the United States Government is engaged in deepening Buffalo harbour, improving the channels between the lakes and the tide waters of the Hudson River. The State Engineer of New York is strenuously urging that a foot of water be added to the Erie Canal by raising the banks, so that the transport of freight may be cheapened by being carried in larger cargoes. Again, during the past two years the tolls on west-bound traffic on the canals have been remitted on some articles and reduced on others, the State looking for compensation in the augmented east-bound business that would be attracted by the lower charges. The prudence of this policy has been proved, inasmuch as last year the quantity of grain shipped by canal from Buffalo was 72,000,000 bushels, an excess of 18,000,000 bushels over the previous year, and 13,500,000 more than 1878; while the total amount received for canal tolls for the last year was $1,164,567, being $238,823 more than the preceding year. The canals, even in their present condition, are capable of carrying still more—up to 100,000,000 bushels yearly, with a proportionate amount of coarse freight. The capitalists and merchants of Baltimore have organised a company for the construction of a ship-canal to be cut through Maryland and Delaware. By this canal Baltimore will have a direct access to the Atlantic. The canal will shorten the distance between the grainfields and the English ports by nearly 200 miles."—Vide *Fortnightly Review* for October, 1881.

A ship-canal through Maryland and Delaware.

Vessels to steam all the way from Chicago to Liverpool.

Canada.—The port of New York foresees her commercial pre-eminence directly threatened by the Canadian system of canals. "Canada has commenced," reports the State Engineer of New York, "and will in a few years complete, the finest system of inland navigation in the world, which will make seaports of our lake cities. . . . British steamships of nearly 2,000 tons will lie at the docks of Chicago and other lake ports unloading their merchandise or receiving their cargoes of grain, provisions, &c." The British, he points out, will not have to tranship or elevate their grain; they can continue their voyage through Lake Ontario, the St. Lawrence, and the ocean, to Europe, only having to pay toll on the Welland Canal and on the river above Montreal.—Vide *Fortnightly Review* for October, 1881.

Greece.—Since national independence was secured to the Greeks in 1830, many proofs have been afforded that the spirit of enterprise which once characterised that people still exists. A recent instance is the establishment of *The International Corinth Maritime Canal Company,* just formed for the purpose of cutting through the Isthmus of Corinth which connects the Morean Peninsula with Hellas, the mainland of Greece. This canal will unite the Gulf of Lepanto with the Ægean Sea, and Corinth will be brought within four hours' steam of the Piræus. At present, vessels making for Athens from the west have to proceed right round the Peninsula of the Morea, and have to double Cape Matapan, involving a detour of 400 to 500 miles.

A ship canal through the Isthmus of Corinth.

Russia.—A great work has been in progress for several years in order to make St. Petersburg one of the great commercial emporiums of the empire. It was partly completed in July last by the opening of a canal to the sea, 15 miles long, which will enable vessels drawing 22 feet of water to proceed right up to St. Petersburg. It is intended to make a new harbour in connection with this canal, the works for which are now progressing along the Gutujefska Island, where magazines, hydraulic cranes, &c., will enable the largest vessels to effect a rapid loading and discharge, whilst branch lines will connect it with the Russian railway system. The work of dredging is now being effected to a depth of 22 feet by means of centrifugal pumps, forcing the mud through enormous floating pipes to beds laid out alongside the bank, thus forming the arms of the new harbour, which is about three miles in circumference. The entire cost of this undertaking is estimated at 13,000,000 roubles.

Ship-canal between St. Petersburg and the sea.

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Manchester Courier.—"An interesting pamphlet. . . . The subject is treated in an exhaustive manner."

Manchester City News.—"An able pamphlet. . . . The author of the pamphlet has not started a new subject, but he has collected a large number of facts and figures which must help to influence public opinion."

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Edinburgh Review.—"Full of valuable statistical information."